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BIRD LICE FROM THE TINAMIDAE

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DEPARTMENT OF ENTOMOLOGY, BRITISH MUSEUM (NATURAL HISTORY)

The species of Mallophaga described by Rudow from *Nothura boraquira* Spix (= *Tinnamus bannaquira* of Rudow) have caused difficulty owing to the fact that Rudow's original material has been lost and no subsequent author has examined material from the type host. In 1939, while on a visit to the United States, Colonel Meinertzhagen and I secured four species of Mallophaga from specimens of *Nothura boraquira* in the collection of Field Museum of Natural History. As a consequence, I am able, in this paper, to make some contribution to the elucidation of Rudow's species. Descriptive and synonymical notes on other Mallophaga from Tinamidae are included. Acknowledgment is due Mr. Rudyerd Boulton, Curator of Birds, for his kind co-operation in making the material available for study, and Mr. Clifford C. Gregg, Director of Field Museum, for providing publication facilities.

In considering Rudow's descriptions it must be remembered that these tend to be somewhat inaccurate, as can be shown by comparing them with the descriptions and figures made by Taschenberg (1882) from Rudow's specimens. Hopkins (1940, p. 418) has also shown that the measurements given by Rudow cannot be taken into consideration, as they seem to have little relation to reality and appear to be the "wildest of guesses." As the majority of Rudow's specimens have been lost, it is important to fix his names definitely to the species from the type hosts which follow the descriptions most closely, even though there are apparent discrepancies. It cannot be emphasized too strongly that once these names have been fixed it is in the interests of all to adopt the usage of the names even if there are differences of opinion over the interpretation of the original descriptions.

Heptapsogaster dilatatus Rudow

Goniocotes dilatatus Rudow, Zeitschr. ges. Naturwiss., 35, p. 479, 1870. Type host: *Nothura boraquira* Spix.

Goniodes dilatatus Giebel, Insecta Epizoa, p. 192, 1874. Host: as above.

Neotype from skin of *Nothura boraquira* Spix from Bolivia. Female, slide No. 12667, in the Meinertzhagen Collection.

Neallotype from skin of same host from Bolivia. Male, slide No. 12667, in the Meinertzhagen Collection.

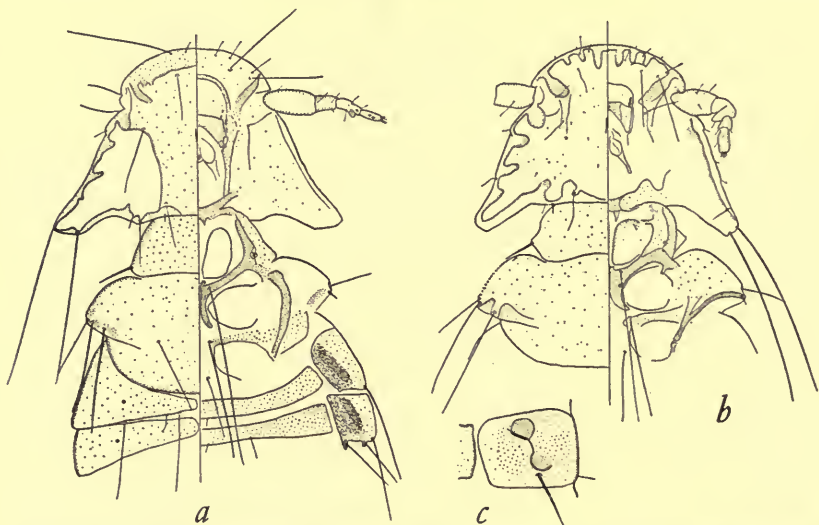


FIG. 31. a, *Heptapsogaster boulloni*, male; head. b, *H. dilatatus*, male; head. c, *H. dilatatus*, female; paratergal plate III.

Neoparatypes from skins of same host from Bolivia and Brazil. Two males, one to be deposited in the collection of Field Museum of Natural History, one, slide No. 12667, in the Meinertzhagen Collection.

Description of female.—General shape as in *H. s. stultus* Clay. Head as shown in fig. 33, a, with bands, markings and chaetotaxy as shown for male (fig. 31, b). Thorax as in male. Abdomen with first two segments modified as is typical for *Heptapsogaster* (see Kéler, 1938, p. 306). Tergal plates II–VII approximating or fusing medially; paratergal plates well marked (fig. 31, c); sternal thickening in the form of a central quadrangular plate in each segment. Tergal plate I has one hair each side of midline; plates II–III have one lateral hair and one hair each side; plates IV–V have one lateral

hair and one hair each side of midline. Paratergal plates II–VII have one marginal hair; plates III–IV have one stout ventral hair; plate V has two ventral hairs. Sternal plates II–III have two small hairs each side of midline; plates IV–V have three small hairs each side of midline. Chaetotaxy and form of terminal segments of the abdomen as shown in fig. 34, c.

Description of male.—Similar in general appearance to the female but the abdomen is less elongated. Head and thorax as shown in fig. 31, b. Abdomen with general arrangement of plates on segments I–V as in female; terminal segments of abdomen as shown in fig. 34, d. Tergal plates I–II with chaetotaxy as in female; plates III–VI with one lateral hair each side. Chaetotaxy of paratergal plates and sternal plates I–V as in female. Genitalia as shown in fig. 33, e.

MEASUREMENTS

	MALE		FEMALE	
	Length mm.	Breadth mm.	Length mm.	Breadth mm.
Head.....	0.300–0.322	0.470–0.510	0.338	0.530
Prothorax.....	0.108–0.123	0.295–0.308	0.108	0.324
Pterothorax.....	0.108–0.115	0.510–0.540	0.108	0.540
Abdomen.....	0.560–0.630	0.585–0.615	0.740	0.625
Total.....	1.08–1.17		1.29	
C.I.....	1.53–1.66.....		1.57	

Remarks.—Mr. G. H. E. Hopkins (1941, p. 48) maintains that Giebel's identification of *dilatatus* Rudow was correct, and with this I agree. Giebel's description differs from *dilatatus* as described above in that he states there are four marginal blotches on the anterior margin, whereas in this species and others of this type of *Heptapso-gaster* there are actually six. It is possible, however, that the outer blotches, which are small, were not counted by Giebel; this may also apply to the blotches on the temple margin where there are three and not two, as stated by Giebel.

Taschenberg's statements (1882, p. 48) on this species are of little value, as he presumed that *dilatatus* was described from *Rhynchotus rufescens* and the Rudow material which he saw was all from this host. Thus his subsequent remarks concerning *dilatatus* are largely invalidated.

It is therefore proposed to apply *dilatatus* Rudow to the species described above and to consider *dilatatus* Giebel as the same. Since Rudow's description must apply to the female, this sex has been chosen as the neotype.

This species is of the same general type as *H. s. stultus* Clay (1937, pl. 1, fig. 4), from which it is distinguished by the form of the internal thickening of the paratergal plates, the male genitalia, and the terminal segments of the female abdomen.

***Heptapsogaster boraquirae* sp. nov.**

Holotype from skin of *Nothura boraquira* from Bolivia. Male, slide No. 12667, in the Meinertzhagen Collection.

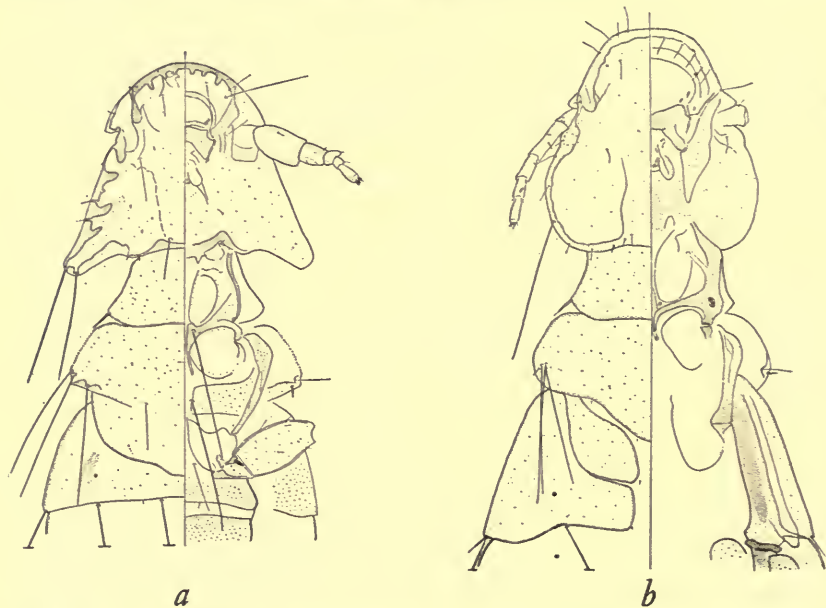


FIG. 32. a, *Heptapsogaster boraquirae*, male; head. b, *Strongylocotes tiniami*, male; head.

Paratypes, same data as the holotype. Two males and three females to be deposited in the collection of Field Museum of Natural History; four males and twelve females, slide No. 12667, in the Meinertzhagen Collection.

Description of male.—A somewhat elongated form showing surface sculpture. Head and thorax as shown in fig. 32, a. Abdomen with first segment (=true segment II) modified as in all species of *Heptapsogaster*; segment II large. Tergal plates transversely continuous; paratergal plates without distinct internal thickening. Sternal thickening in the form of central quadrangular plates, the lateral margins continuous, thickened, and somewhat raised,

forming a dark line down each side of the abdomen. Terminal segments of abdomen as shown in fig. 35, *d*. Tergal plate I with a hair each side of midline; plates II–III with one lateral, one medium-sized and one small hair each side; segments IV–V with one lateral and two small hairs each side of midline. Paratergal plates II–VII with one marginal hair each side of abdomen; plates III–IV with

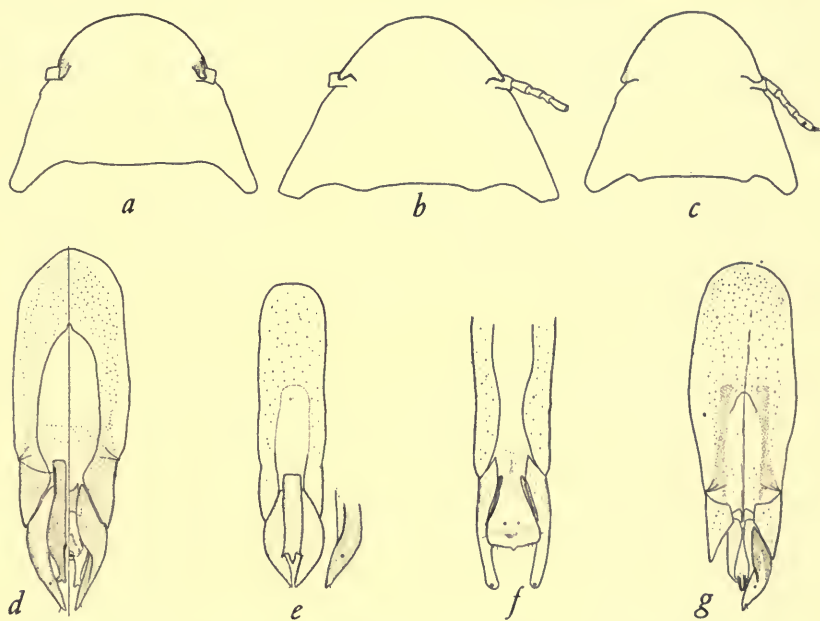


FIG. 33. a, *Heptapsogaster dilatatus*, female; head. b, *H. boultoni*, female; head. c, *H. boraquirae*, female; head. d, *H. boraquirae*, male; genitalia. e, *H. dilatatus*, male; genitalia. f, *Strongylocotes tinnami*, male; genitalia. g, *Heptapsogaster boultoni*, male; genitalia.

one ventral hair; plates V–VII with two ventral hairs. Sternal plate II with one hair on each side of midline; and plates III–V with two hairs on each side of midline. Chaetotaxy of terminal segments as shown in fig. 35, *d*. Genitalia as shown in fig. 33, *d*, and characterized by the forked endomeres.

Description of female.—Similar in general appearance to male with head as shown in fig. 33, *c*. Chaetotaxy of head and characters of thorax as in male, except that the hair each side of midline of occiput is considerably smaller. Plates on segments I–V arranged as in male. Sternal plate II with one to two hairs each side of midline; plates III–IV with two to three hairs each side; plate V with four

hairs each side of midline. Chaetotaxy of terminal segments as shown in fig. 35, *c*.

MEASUREMENTS				
	MALE		FEMALE	
	Length mm.	Breadth mm.	Length mm.	Breadth mm.
Head.....	0.370-0.384	0.500-0.525	0.384-0.400	0.480-0.510
Prothorax.....	0.138-0.154	0.320-0.330	0.138-0.154	0.322-0.340
Pterothorax....	0.138-0.154	0.460-0.475	0.138-0.154	0.465-0.492
Abdomen.....	0.915-0.925	0.584-0.610	1.065-1.080	0.690-0.725
Total.....	1.55-1.61		1.73-1.75	
C.I.....	1.315-1.365		1.235-1.295	

Remarks.—This species is similar to *H. testudo* Clay, and the same thickened lateral margins on the sternal plates give a characteristic appearance to the abdomen. It is distinguished from *testudo*, amongst other characters, by the shape of the head in both sexes and by the male genitalia.

Heptapsogaster boultoni sp. nov.

Holotype from a skin of *Nothura boraquira* from Bolivia. Male, slide No. 12667, in the Meinertzhagen Collection.

Paratypes, same data as the holotype. Two males and two females in the collection of Field Museum of Natural History; nine males and nine females, slide No. 12667, in the Meinertzhagen Collection.

Description of male.—Head and thorax as shown in fig. 31, *a*. Abdomen with first two segments modified as in typical *Heptapsogaster*. Tergal plates on segments II-IV separated medianly; those on segments V-VII approximating or fusing centrally. Paratergal plates with elongated internal thickening and with backwardly directed projections on the posterior margin in some of the segments. Segment II may have a small projection; segment III has two, each bearing a hair; and segments IV-V have one projection. Sternal thickening in the form of a central plate in each segment. Form and plates of terminal segments as shown in fig. 35, *b*. Tergal plate I has one hair each side of midline; plates II-III have one lateral hair and two on each side; plates IV-V have one lateral hair and one each side of midline. Paratergal plates II-VI have one marginal hair each side and plates III-V have two ventral hairs. Sternal plates I-II have one hair each side of midline; plates II-IV have three hairs each side; and plate V has five hairs each side of midline.

Chaetotaxy of terminal segments as shown in fig. 35, *b*. Genitalia of the same general type as in other *Heptapsogaster* (fig. 33, *g*).

Description of female.—Similar in general appearance to male but somewhat larger. Head as shown in fig. 33, *b*. Thorax as in male.

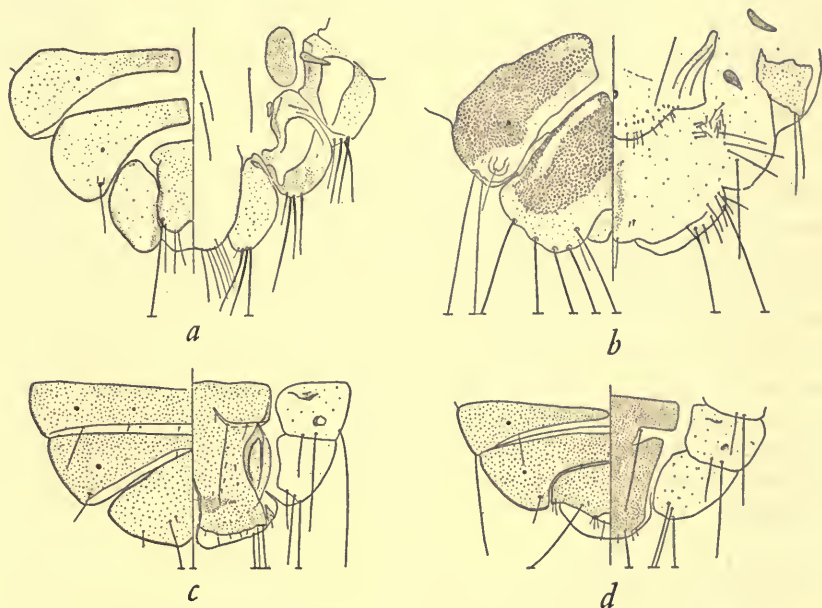


FIG. 34. *a*, *Strongylocotes tiniami*, male; terminal segments of abdomen. *b*, *S. tiniami*, female; terminal segments of abdomen. *c*, *Heptapsogaster dilatatus*, female; terminal segments of abdomen. *d*, *H. dilatatus*, male; terminal segments of abdomen.

Abdomen somewhat more elongated than in male and differing markedly in having the sternal thickening in the form of two lateral plates in each segment, not as a single continuous central plate as in the male. Tergal plates separated medianly; paratergal plates similar to those of the male but with one minute and three normal backwardly directed processes on segments III–IV and with one normal and one minute similar process on segment V. Tergal plate I has one central hair each side; plates II–IV have one lateral hair and two on each side of the midline. Paratergites with marginal hairs as in the male; paratergites III–VI with three ventral hairs. Sternal plates I–II with one hair each side of midline; plates III–V with five hairs each side of midline. Chaetotaxy of terminal segments as shown in fig. 35, *a*.

MEASUREMENTS

	MALE		FEMALE	
	Length mm.	Breadth mm.	Length mm.	Breadth mm.
Head.....	0.520-0.540	0.890-0.915	0.585-0.600	1.000-1.030
Prothorax.....	0.200-0.215	0.475-0.480	0.216-0.225	0.484-0.495
Pterothorax.....	0.214-0.225	0.780-0.795	0.220-0.230	0.830-0.846
Abdomen.....	1.015-1.080	0.940-0.970	1.285-1.295	1.100-1.118
Total.....	1.850-1.950		2.340-2.380	
C.I.....	1.685-1.740		1.67-1.72	

Remarks.—This species has been placed in *Heptapsogaster*, although it cannot be considered at all typical of the genus as now constituted. However, it is the opinion of the author that too many genera have been erected for the species from the Tinamidae and that as more species are discovered some of the genera will have to be sunk. As it is probable that *Heptapsogaster* will have to be widened to include a number of more diverse forms, it seems more satisfactory to keep this species within the genus *Heptapsogaster*, at any rate for the present. *H. boultoni* is larger than the typical members of the genus and lacks the internal projections from the clypeal band. The species is named in honor of Mr. Rudyerd Boulton.

Strongylocotes tinnami Rudow

Nirmus tinnami Rudow, Zeitschr. ges. Naturwiss., 35, p. 473, 1870. Type host: *Nothura boraquira* Spix.

Nirmus ansatus Rudow, l.c., p. 474. Type host: as above.

Neotype from skin of *Nothura boraquira* Spix from Bolivia. Male, slide No. 12667, in the Meinertzhagen Collection.

Neoparatypes, same data as the neotype. Male and female to be deposited in the collection of Field Museum of Natural History; two females, slide No. 12667, in the Meinertzhagen Collection.

Description of male.—A typical *Strongylocotes* with head and thorax as shown in fig. 32, b. Abdomen tapering evenly to the narrow terminal segments and with segment I (= true segment II) modified as in other species of *Strongylocotes* (see Kéler, 1938, p. 308). Tergal plates with pitted surface; plates on segments I-VII separated medianly; lateral internal thickening in the form of pillar-like structures. Sternal thickening in the form of two plates, one heavily sclerotized, narrow, and with the longest axis lying horizontal, the other two more lightly sclerotized and with the longest axis vertical.

Characters and chaetotaxy of segments I-II and VI-IX as shown in fig. 34, *a*. Tergal plates III-V have one long hair and one smaller hair at the inner margin of the plates. Paratergal plates II-IV have two marginal hairs each side; plate V has three; plate VI has four; plate VII has three to four; plate VIII has four to five. Sternites III-IV have one fine hair on each side of midline and sternite V has two hairs each side. Genitalia of the same general type as found in other species of *Strongylocotes* (fig. 33, *f*).

Description of female.—Head of same general shape as that of male but proportions somewhat different (see Table of Measurements). Chaetotaxy of head, and shape and chaetotaxy of thorax as in male. Abdomen with segments I-VI similar to those of male but with tergal plates V-VI somewhat broader and those on segments II-VI with an indentation in the posterior margin. Chaetotaxy of tergites, paratergites, and sternites I-V as in male. Chaetotaxy and characters of terminal segments as shown in fig. 34, *b*.

MEASUREMENTS

	MALE		FEMALE	
	Length mm.	Breadth mm.	Length mm.	Breadth mm.
Head.....	0.745	0.725	0.770-0.785	0.710-0.740
Prothorax.....	0.310	0.555	0.360	0.560
Pterothorax.....	0.400	0.815	0.435	0.860
Abdomen.....	1.570	1.170	1.800	1.290
Total.....	2.8		3.1	
C.I.....	0.97		0.928-0.945	

Remarks.—If it is assumed that *Nirmus crassiceps* Rudow (1870, p. 473) is *Strongylocotes lipogonus* Nitzsch, as figured by Carriker (1936, pl. 6, fig. 1), then it can be assumed that *N. tinnami* Rudow is also a *Strongylocotes*. If it is also assumed, as suggested by Carriker (1936, p. 93) that *tinnami* and *ansatus* are the two sexes of the same species, then it is necessary to find a species of *Strongylocotes* in which the hind end of the head is rounded and in which one sex has the abdomen with “dreihöckrigem Ende” and the other has the abdomen with “Enden abgerundet, dicht behaart, der vorletzte Ring ragt mit einer Spitze in den letzten über.” A species of *Strongylocotes* of the *lipogonus* group from the type host complies with these qualifications and, except for the description of the general shape of the head and some of the proportions given by Rudow, fits the descriptions of *tinnami* and *ansatus*. The heads of these specimens from *Nothura boraquira* do not appear obviously more triangular than that of

lipogonus (= *crassiceps*), but, as the other characters of these specimens agree with the description and as the head can be considered to be slightly more triangular, it seems most convenient to apply these names to the species described above.

It is not possible to state definitely which, if either, of the descriptions applies to the male, as it is not unlikely that one of the speci-

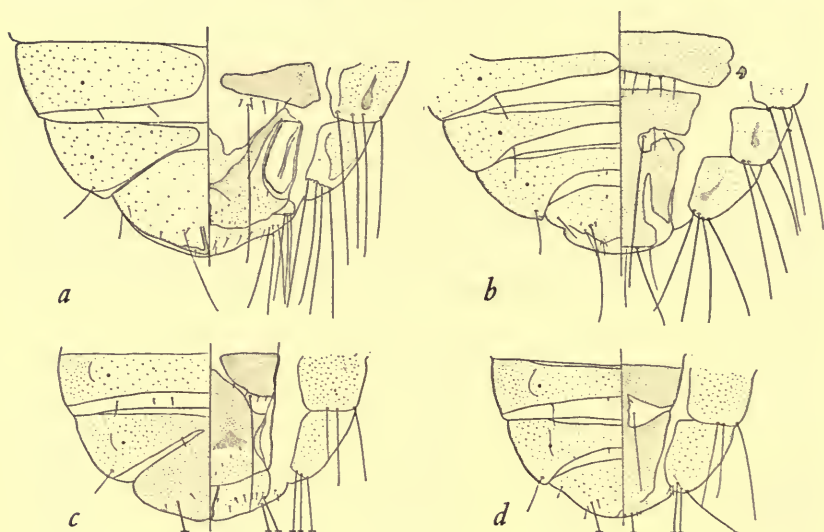


FIG. 35. a, *Heptapsogaster boultoni*, female; terminal segments of abdomen. b, *H. boultoni*, male; terminal segments of abdomen. c, *H. boraquirae*, female; terminal segments of abdomen. d, *H. boraquirae*, male; terminal segments of abdomen.

mens examined by Rudow was immature, thus emphasizing the differences between the two. However, it is stated that *ansatus* has the longer head and, as the description of the terminal segments of the abdomen can apply to either sex, it is proposed to consider *ansatus* as the female and *tinnami* as the male. This has the added advantage of making it possible to designate the male as the neotype.

This species is distinguished from *lipogonus* by the shape of the head and by the characters of the terminal segments of the abdomen in both sexes.

Strongylocotes Taschenberg

Strongylocotes Taschenberg, Nova Acta Acad. Leop.-Carol. Nat., 24, p. 54, 1882.

Nirmocotes Carriker, Proc. Acad. Nat. Sci. Phila., 88, p. 79, 1936.

Through the kindness of Mr. Carriker it has been possible to examine the specimens of *Nirmocotes nirmoides* Carriker and there appears to be little doubt that this and the other species of *Nirmocotes* are actually immature *Strongylocotes*. This being the case, it is necessary to review the synonymy of the species contained in the genera *Nirmocotes* and *Strongylocotes*.

***Strongylocotes orbicularis* Carriker**

Nirmocotes orbicularis Carriker, Proc. Acad. Nat. Sci. Phila., 88, p. 79, fig. 1, 1936 (part, male). Type host: *Crypturellus tataupa* Temminck.

The figure of the male to which the name must apply, as this sex is mentioned first, appears to represent an almost mature male of the *Strongylocotes lipogonus* type. The figure of the female (l.c., pl. 5, fig. 1, a) appears to be identical with immature specimens of *Strongylocotes paucisetosus* Kéler, i.e., *S. glabrous* Carriker (see below) from the same host, examined by the present author.

***Strongylocotes glabrous* Carriker**

Nirmocotes glabrous Carriker, Proc. Acad. Nat. Sci. Phila., 88, p. 82, pl. 5, fig. 3, 1936. Type host: *Crypturellus tataupa* Temminck.

(?) *Nirmocotes orbicularis* Carriker, l.c., p. 79, pl. 5, fig. 1, a, 1936 (part, female). Type host: *C. tataupa* Temminck.

Strongylocotes paucisetosus Kéler, Arb. Morph. Taxon. Ent., 5, p. 320, fig. 9, 1938. Type host: *C. tataupa* Temminck.

Carriker's figure of *glabrous* appears to represent a somewhat more mature specimen of the species figured as the female of *orbicularis* and appears conspecific with immature specimens of *S. paucisetosus* Kéler except for the anterior margin of the head. It is possible that the specimen of *S. glabrous* is somewhat distorted, as the clypeal band appears to be pushed out in such a manner as to give the appearance of another pair of trabeculae. *S. paucisetosus* Kéler must therefore be considered as a synonym of *S. glabrous* Carriker.

***Strongylocotes complanatus complanatus* Piaget**

Goniodes complanatus Piaget, Les Pédiculines, p. 262, pl. 21, fig. 8, 1880. Type host: *Crypturellus o. obsoletus* Temminck (= *Tinamus obsoletus*).

Nirmocotes nirmoides Carriker, Proc. Acad. Nat. Sci. Phila., 88, p. 80, pl. 4, fig. 3, 1936. Type host: *Crypturellus obsoletus punensis* Chubb.

Carriker's figure of *nirmoides* appears to represent an immature female of *Strongylocotes c. complanatus* and is identical with immature specimens of this species from the type host, *Crypturellus o. obsoletus*.

Nirmocotes nirmoides Carriker must therefore be considered as a synonym of *S. c. complanatus* Piaget.

Strongylocotes cordiceps Carriker

Nirmocotes cordiceps Carriker, Proc. Acad. Nat. Sci. Phila., 88, p. 83, pl. 5, fig. 2, 1936. Type host: *Tinamus m. major* Gmelin.

This appears to be an immature *Strongylocotes* of the *spinosus* type. A single male specimen examined from *Tinamus major castaneiceps* Salvadori of the *spinosus* type is probably this species.

Strongylocotes wernecki Guimarães and Lane

Strongylocotes wernecki Guimarães and Lane, Rev. Mus. Paul., 23, p. 17, pl. 5, figs. 6, 6a, and 6b, 1937. Type host: *Tinamus solitarius* Vieillot.

Strongylocotes latithorax Kéler, Arb. Morph. Taxon. Ent., 5, p. 313, figs. 1, 6, 7, 1938. Type host: *Tinamus solitarius* Vieillot.

S. latithorax Kéler must be considered a synonym of *S. wernecki* Guimarães and Lane from the same host.

Cuclotogaster Carriker

Cuclotogaster Carriker, Proc. Acad. Nat. Sci. Phila., 88, p. 67, 1936.

Gallipeurus Clay, Proc. Zool. Soc. Lond., (B), 108, p. 135, 1938.

Mr. Carriker has kindly sent me the female of *Cuclotogaster laticorpus* Carriker from *Crypturellus soui modestus* Cabanis mentioned on page 68 (Carriker, 1936). Although this specimen is in poor condition, it appears to be certainly congeneric with and probably conspecific with *Gallipeurus h. heterographus* Giebel, the genotype of *Gallipeurus* Clay. Mr. Carriker has also written in a letter which he gives me permission to quote, that "I can find absolutely no difference between the two specimens (type of *Cuclotogaster* and specimen of *heterographus*) as to shape, proportions, markings and chaetotaxy. The only discrepancy I find is in the measurements, principally of the abdomen."

However, as there is considerable variation in the size of the abdomen among specimens of *heterographus*, it can be assumed that these two species are the same. Thus *Cuclotogaster laticorpus* Carriker (1936, p. 67) is a synonym of *Gallipeurus h. heterographus* Giebel and therefore necessitates the sinking of *Gallipeurus* as a synonym of *Cuclotogaster* (for further synonymy of *G. h. heterographus* see Clay, 1938, p. 136).

Discussing the occurrence of *heterographus* on *Crypturellus*, Mr. Carriker states: "It is barely possible that I might have carried a dead

chicken in my collecting bag. Also I have noted that *Crypturellus soui* does frequently inhabit the brush around small villages, in which villages domestic fowl are constantly prowling about, and they might occasionally pick up some of their parasites."

It is possible therefore that the chickens and tinamous may share dust baths and thus exchange parasites (see Hoyle, 1938, p. 379).

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INDEX

Current names in roman type, synonyms and secondary references in *italic* type, new names in **bold-faced** type.

- abbas, Thraupis, 221
Ablabes decemlineatus, 80
 purpurans, 285
 abyssinicus, Unio, 124
Acanthagrion interruptum, 372-373
Acanthodactylus arabicus, 63
 asper, 62
 euphraticus, 63
 fraseri, 162
 iracensis, 60-62
 orientalis, 62
 robustus, 63
 syriacus, 63
Acanthotropis, 95
acarnanicus, Psilunio, 134
Accipiter bicolor, 202
 velox, 202
Acontias punctatus, 337
acuminata, *Dryiophis*, 318
acuminatus, *Coluber*, 291-292, 318
 Oxybelis, 291-292, 318
Acuticosta chinensis, 263
adjuncta, *Stachyris*, 110-111
adolphi, *Phoethornis*, 207-208
adramitana, *Agama*, 56
aegyptia, *Lacerta*, 59
aegyptius, *Uromastix*, 59, 162
aeneus, *Tangavivus*, 220
aesculapii, *Coluber*, 292
 Erythrolamprus, 292
affinis, *Tanagra*, 221
Agama adramitana, 56
 agilis, 57
 caucasica, 57
 microlepis, 57
 nupta, 57
 pallida, 57, 161
 persica, 57, 162
 picea, 58
 rudrata, 57
 scutellata, 59
 sinaita, 58
 stellio, 58, 162
Agelaius matudae, 221
agilis, *Agama*, 57
Agriocharis ocellata, 204-205
Agyrtia candida, 208
Ahaetulla nigromarginatus, 283
Albepharus festae, 67
albifrons, *Leptotyphlops*, 28
albigularis, *Falco*, 204
albilinea, *Iridoprocne*, 216
albinucha, *Thryothorus*, 217
albiventris, *Aramides*, 205
aleroni, *Unio*, 126
Alsophylax blanfordii, 55
 tuberculatus, 54-55
Amazilis rutila, 208
 tzacatl, 208
 yucatanensis, 208
Amazona autumnalis, 206-207
 nana, 206
 xantholara, 206
Amblena gigantea, 261
 plicata, 260-261
Amblycercus holosericeus, 220
Ameiva undulata, 242-243
americana, *Mycteria*, 202
americanus, *Coccyzus*, 207
Amystes ehrenbergii, 64
Anas leucogenis, 349-350
Anguis jaculus, 71
angusticeps, *Cnemidophorus*, 24-25
angustifolius, *Rhinolophus*, 43
angustilineatus, *Dromicus*, 308-309
annectens, *Rhinolophus*, 37-38
annulata, *Leptodeira*, 289, 311-312
 Leptodeira, 289
annulatum, *Sibon*, 311-312
annulatus, *Coluber*, 289
Anodonta cygnea, 136-138, 265
 grandis, 260
 lauta, 262
 vescoiana, 138, 265
 woodiana, 138
Anodontinae, 136-138
Anolis auratus, 9
 barkeri, 7-9
 cozumelae, 19-20
 holotropis, 9
 laeviventris, 20-21
 meridionalis, 9
 nebuloides, 21
 ophiolepis, 10
 rosenbergi, 9
 schmidtii, 21-23
Anoura, 274
ansatus, *Nirmus*, 382-384
Anthracothonax prevostii, 208
Anthus rubescens, 218
Antiagrion, 370-371
Anticordulia, 367-370
Apathya urmiana, 60
Aporoscelis benti, 59
approximans, *Holbrookia*, 341-342
 Holbrookia, 342-343
arabicus, *Acanthodactylus*, 63
 Phrynocephalus, 58
 Rhynocalamus, 77
 Scincus, 69-70

- Ara macao, 206
 Aramides albiventris, 205
 Aratinga astec, 206
 Ardea herodias, 201
argenteus, *Coluber*, 292
 Oxybelis, 292
 armata, Merganetta, 353-356
 Arremonops chloronotus, 224
 verticalis, 224
Ascalabotes sthenodactylus, 54
 ascanius, *Unio*, 122
asiana, *Zamenis*, 72-73
 asianus, *Coluber*, 72-73
asiatica, *Zenaida*, 205
Aspatharia petersi, 262
 asper, *Acanthodactylus*, 62
aspera, *Lacerta*, 62
Aspidonectes emoryi, 19
Aspis cerastes, 88, 165
 assimilis, *Pipromorpha*, 216
 astec, *Aratinga*, 206
 asuncionis, *Diplodon*, 262
Atractaspis conradi, 337
Atractus badius, 285-286
 emmelii, 286
 nigricaudus, 327-329
 pauciscutatus, 326-327
 vertebralis, 286
 atratus, *Coragyps*, 202
 atriceps, *Saltator*, 222
atrox, *Coluber*, 295
 Trimeresurus, 295
Attila gaumeri, 212-213
Aulacorhynchus osgoodi, 228-230
 aura, *Cathartes*, 202
 aurantius, *Lanio*, 222
aurata, *Lacerta*, 66
 Mabuya, 66
auratus, *Anolis*, 9
 Icterus, 221
 Norops, 9
 auricularia, *Margaritifera*, 119, 264
 aurocapillus, *Seiurus*, 219
 autumnalis, *Amazona*, 206-207
 averyi, *Micrurus*, 45-47

badius, *Brachyorrhos*, 285-286
balzani, *Elaps*, 293
 Micrurus, 293
 barberi, *Hypopachus*, 1-2
 barkeri, *Anolis*, 7-9
barnetti, *Bothrops*, 322
 Trimeresurus, 322
 bartschi, *Cymatosyrinx*, 172-174
Basiliscus vittatus, 242
 batavus, *Unio*, 130-131
 baudinii, *Hyla*, 238
 Bellamya, 94
 bellii, *Chrysemys*, 17
 Emys, 17
 benti, *Aporoscelis*, 59
 berlepschi, *Merganetta*, 352

 bicolor, *Accipiter*, 202
 bidens, *Neogomphus*, 367
 birdi, *Gymnophthalmus*, 245
 bitorquatus, *Oxyrhopus*, 290
 Tachymenis, 290
 Blake, Emmet R., A New Venezuelan
 Honey Creeper, 155-157; Two
 New Birds from British Guiana,
 227-232
 blanchardi, *Natrix*, 29
 blanfordi, *Ophisops*, 64-65
 blanfordii, *Alsophylax*, 55
 Bunopus, 55
 blatteus, *Pyrocephalus*, 214
 Boa hortulana, 280
 ortonii, 305-306
boddaertii, *Coluber*, 280-281
 Dryadophis, 280-281
 Boidae, 305-306
 Boigidae, 311-319
 boraquirae, *Heptapsogaster*, 378-
 380
 borysthenensis, *Unio*, 129, 267
Bothrops barnetti, 322
 microphthalmus, 295
 pictus, 322-323
 boucardi, *Granatellus*, 220
 boultoni, *Heptapsogaster*, 380-382
 bourgeticus, *Unio*, 125
 brachidactyla, *Geothlypis*, 219
Brachyorrhos badius, 285-286
 brachytarsus, *Myiochanes*, 215
 brachyurus, *Nannorchilus*, 217
brevicollis, *Euprepis*, 67
 Mabuia, 67
 Mabuya, 67
 brevirostris, *Eremias*, 66
 Mesalina, 66
 Rhynchocyclus, 215
 bruguierianus, *Unio*, 132
 Bufo marinus, 238
 microtis, 238
 regularis, 332
 viridis, 53, 161
 wrighti, 151-154
Bunopus blanfordii, 55
 tuberculatus, 54-55
 Buteo conspectus, 203
 direptor, 203
 micrus, 203
 Butorides virescens, 201

 Caelatura horei, 262
 caerulea, *Guiraca*, 223
Calamaria coronella, 78-79
 calathus, *Planorbis*, 98
 calcarifer, *Chamaeleo*, 70
 calyptratus, *Chamaeleo*, 71
 Campeloma decimum, 94
 integrum, 93
 Camras, Sidney, A New Savannah
 Sparrow from Mexico, 159-160

- cancrominus, *Platyrrhinus*, 215
 candeï, *Manacus*, 213
 candida, *Agyrtria*, 208
 canilatus, *Tachymenis*, 315-317
 canivetii, *Chlorostilbon*, 208
 capax, *Proptera*, 261
 capistrata, *Tantilla*, 318-319
 carinata, *Egernia*, 11-13
 Lampsilis, 261
 Pseudoboa, 88
 carinatus, *Chironius*, 281
 Coluber, 281
 Echis, 88
 carneus, *Unio*, 131
 carolinensis, *Dumetella*, 217
 Caryothraustes polioagaster, 223
 Casmerodius egretta, 201
 caspica, *Clemmys*, 89
 Testudo, 89
 Cassidix mexicanus, 220
 castaneus, *Celeus*, 210
 catesbyi, *Coluber*, 288
 Dipsas, 288
 Cathartes aura, 202
 caucasica, *Agama*, 57
 caucasicus, *Stellio*, 57
 caudaelineata, *Elaphe*, 76
 caudaelineatus, *Zamenis*, 76
 Caudiculatus caudiculatus, 264
 caudiculatus, *Caudiculatus*, 264
 Caudisona terrifica, 296
 Celeus castaneus, 210
 cenchoa, *Coluber*, 289
 Imantodes, 289
 Centrotrachelus loricatus, 59
 Centurus dubius, 210
 rubriventris, 210
 Ceophloeus similis, 210
 cerastes, *Aspis*, 88, 165
 Coluber, 88
 persicus, 88
 Cercomacra crepera, 212
 cerebralis *Protosquilla*, 105-106
 Cerithium semiferrugineum, 171
 Chalcides ocellatus, 70
 sepsoides, 70
 Chamaeleo calcarifer, 70
 calyptratus, 71
 chamaeleon, 70
 chamaeleon, *Chamaeleo*, 70
 Lacerta, 70
 Chamaethlypis palpebralis, 219
 Chamberlainia hainesiana, 264
 Chamaeleo kinetensis, 336-337
 chamissonis, *Coronella*, 283-284
 Dromicus, 283-284
 Dromicus, 308-309
 championi, *Hypopachus*, 242
 chapmani, *Herpetotheres*, 203
 Charadrius vociferus, 205
 chaseni, *Rhinolophus*, 38-39
 chinensis, *Acuticosta*, 263
 Chironius carinatus, 281
 fuscus, 283
 multiventris, 282-283
 Chloroceryle isthmica, 209
 stictoptera, 209
 chloronotus, *Arremonops*, 224
 Tyrannus, 214
 Chlorophanes guatemalensis, 219
 Chlorostilbon canivetii, 208
 Choeroniscus, 274
 Choeronycteris, 273
 Chondroheirax uncinatus, 202
 chrysater, *Icterus*, 221
 Chrysemys bellii, 17
 cinereiceps, *Tolmomyias*, 215
 cinereigulare, *Omostoma*, 216
 circinalis, *Elaps*, 319-320
 Circus hudsonius, 203
 ciris, *Passerina*, 224
 Cissolopha rivularis, 217
 yucatanica, 217
 Cistudo ornata, 18-19
 yucatanica, 17-18
 citrea, *Protonotaria*, 219
 citrina, *Wilsonia*, 220
 Claravis pretiosa, 205-206
 clarus, *Mimus*, 218
 Clay, Theresa, Bird Lice from the
 Tinamidae, 375-387
 clelia, *Clelia*, 289-290
 Coluber, 289-290
 Clelia clelia, 289-290
 cloelia, 289-290
 fitzingeri, 313-315
 Clemmys caspica, 89
 cliffordii, *Coluber*, 77
 Spalerosophis, 77, 165
 cloelia, *Clelia*, 289-290
 Cnemidophorus angusticeps, 24-25
 deppii, 25, 243-244
 lineatissimus, 25-26
 octolineatus, 27
 oligoporus, 26-27
 sackii, 244-245
 cobella, *Coluber*, 285
 Liophis, 285
 Coccyzus americanus, 207
 Colinus nigrogularis, 204
 collaris, *Coluber*, 78
 Eirenis, 78
 colombiae, *Cryptophora*, 186
 colombiana, *Merganetta*, 346-348
 Coluber acuminatus, 291-292, 318
 aesculapii, 292
 annulatus, 289
 argenteus, 292
 asianus, 72-73
 atrox, 295
 boddaertii, 280-281
 carinatus, 281
 catesbyi, 288
 cenchoa, 289

- Coluber cerastes*, 88
clelia, 289-290
cliffordii, 77
cobella, 285
collaris, 78
corais, 281
fulgidus, 292
fuscus, 283
insignitus, 85-86
lemniscatus, 294
lineolatum, 86
melanocephala, 293
moilensis, 86
najadum, 73
nummifer, 75
olfersii, 291
petola, 290
ravergieri, 76
reginae, 284
rhodorachis, 73, 165
rogersi, 73-74
schokari, 86-87
severus, 284-285
ventromaculatus, 74
viridissimus, 291
Colubridae, 306-310
Columba flavirostris, 205
pallidicrissa, 205
Columbigallina pallescens, 205
rufipennis, 205
compacta, *Pseudanodonta*, 140, 265
complanata, *Lasmigona*, 260
Pseudanodonta, 139
complanatus, *Gonoides*, 385-386
Strongylocotes, 385-386
compressa, *Microcondylaea*, 133
Compsothlypis pusilla, 219
concolor, *Conophis*, 31
concreta, *Cyanocompsa*, 224
conirostris, *Scincus*, 70
Conophis concolor, 31
sumichrasti, 31-32
viduus, 31
vittatus, 31-32
Conopsis nasus, 32
Conover, Boardman, A Study of the
Torrent Ducks, 345-356
conradi, *Atractaspis*, 337
conspetus, *Buteo*, 203
Constrictor constrictor, 305-306
ortonii, 305-306
constrictor, *Constrictor*, 305-306
Contradens dimotus, 263
Coragyps atratus, 202
corais, *Coluber*, 281
Drymarchon, 281
cordiceps, *Nirmocotes*, 386
Strongylocotes, 386
Cordulia villosa, 367-370
coronella, *Calmaria*, 78-79
Eirenis, 78-79
Coronella chamissonis, 283-284
tessellata, 71-72
cortezii, *Phrynosoma*, 23
Tapaya, 23
costata, *Lasmigona*, 260
cozumelae, *Anolis*, 19-20
crassus, *Unio*, 129, 266
crepera, *Cercomacra*, 212
crinitus, *Myiarchus*, 214
Cristaria discoidea, 262
herculea, 262
spatiosa, 263
crocatus, *Neurergus*, 52-53
Crotalidae, 322-323
Crotalus terrificus, 296
Crotophaga sulcirostris, 207
Cryptophora colombiae, 186
Crypturellus intermedius, 199-201
meserythrus, 199
Ctenosaura pectinata, 23
Cuclotogaster, 386-387
cumingii, *Hyriopsis*, 264
cuniculator, *Tantilla*, 32-34
cyanea, *Passerina*, 224
cyanocinctus, *Hydrophis*, 87
Cyanocompsa concreta, 224
parellina, 223
cyanogenys, *Psilorhinus*, 216
Cyclarhis yucatanensis, 218
Cyclura pectinata, 23
cygnea, *Anodonta*, 136-138, 265
cylindrica, *Lanceolaria*, 263
Cymatosyrinx bartschi, 172-174
cytherea, *Unio*, 129, 266
dahurica, *Margaritifera*, 120, 264
decemlineata, *Eirenis*, 80
decemlineatus, *Ablabes*, 80
decipiens, *Unio*, 125
decisum, *Campeloma*, 94
decoloratus, *Pionus*, 206
decurtatus, *Hylophilus*, 218
degenhardtii, *Stenorhina*, 245-246
Deignan, H. G., Three New Birds of
the Genus *Stachyris*, 109-114
delesserti, *Psilunio*, 135
delphinus, *Unio*, 123
dembeae, *Unio*, 128
Dendrocincla homochroa, 211
typhla, 211
Dendrocolaptes sancti-thomae, 211
Dendroica magnolia, 219
pennsylvanica, 219
rubiginosa, 219
dendrophis, *Drymobiuss*, 280
Herpetodryas, 290
densestriata, *Valvata*, 102
deppei, *Cnemidophorus*, 243-244
Poliophtila, 218
deppei, *Cnemidophorus*, 25
deserticola, *Salvadora*, 146-148
deses, *Tityra*, 213

- diadema*, *Heterodon*, 74
Lytorhynchus, 74
dichrous, *Spilotes*, 307-308
Diglossa mandeli, 155-157
dilatatus, *Goniodes*, 376-378
Heptapsogaster, 376-378
dimotus, *Contradens*, 263
Diplodon asuncionis, 262
Diplometopon zarudnyi, 60
diplozeugus, *Geophis*, 286-288
Dipsas catesbyi, 288
indica, 288
peruanus, 288-289
rhinopoma, 85
direptor, *Buteo*, 203
discoidea, *Cristaria*, 262
diversus, *Rhinolophus*, 42-43
Dives dives, 220
dives, *Dives*, 220
dorseyi, *Placostylus*, 102
Dromicus angustilineatus, 308-309
chamissonis, 283-284
chamissonis, 308-309
elegans, 317-318
inca, 325-326
rufidorsatus, 315-317
tachymenoides, 309-310
Dromococcyx ruficularis, 207
Dryadophis boddaertii, 280-281
heathii, 306-307
Dryophis acuminata, 318
Drymarchon corais, 281
melanurus, 307-308
Drymobius dendrophis, 280
heathii, 306-307
Dryobates parvus, 211
Dryophylax elegans, 315-317
freminvillei, 317-318
vitellinus, 315-317
dubius, *Centurus*, 210
dugesii, *Geophis*, 28-29
dumerilii, *Siredon*, 17
Dumetella carolinensis, 217
duponi, *Northarchus*, 209
durieui, *Unio*, 128
Dysithamnus septentrionalis, 212
Echis carinatus, 88
Ecitomyia termitoxena, 186-188
Egernia carinata, 11-13
egretta, *Casmerodius*, 201
ehrenbergii, *Amystes*, 64
Ophisops, 64
Eirenis collaris, 78
coronella, 78-79
decemlineata, 80
fraseri, 79-80
iranica, 81-82
lineomaculata, 80-81
rothi, 80
Elainea subpagana, 216
Elanoides forficatus, 202
Elaphe caudaelineata, 76
nummifera, 75-76
ravergieri, 76
Elapidae, 319-322
Elaps balzani, 293
circinalis, 319-320
hemprichii, 293
obscura, 294
surinamensis, 295
tschudii, 320
elegans, *Dromicus*, 317-318
Dryophylax, 315-317
Lygophis, 317-318
Ophisops, 63-64
Philodryas, 315-317
Philodryas, 317-318
Tachymenis, 315-317
Eleutherodactylus rugulosus, 239
elisae, *Phyllodactylus*, 56
elongata, *Pseudanodonta*, 139
elongatulus, *Unio*, 124
emmeli, *Atractus*, 286
Geophis, 286
emoryi, *Aspidonectes*, 19
Platypeltis, 19
Empidonax minimus, 215
Emys bellii, 17
Erator fraserii, 213
Eremias brevirostris, 66
guttulata, 65
persica, 66
watsonana, 66
Erolia minutilla, 205
Erythrolamprus aesculapii, 292
erythrothorax, *Syrallaxis*, 211
erythrozonus, *Pteroglossus*, 210
Eryx familiaris, 71
jaculus, 71
eucirrus, *Unio*, 128
Eucometis pallida, 222
Eudryas melanolomus, 29
Eumeces princeps, 67-68
variegatus, 68-69
Eumomota superciliosa, 209
euphratica, *Testudo*, 89
Vipera, 87
euphraticus, *Acanthodactylus*, 63
Pseudodontopsis, 133, 265
Trionyx, 89
Euprepis brevicollis, 67
princeps, 67-68
septemtaeniatus, 66
varius, 332
Eulaenia macrostemma, 29-30
megaloops, 30-31
exiguus, *Momotus*, 209
Falco albigularis, 204
sparverius, 204
familiaris, *Eryx*, 71
fellmanni, *Psilunio*, 135-136
festae, *Albepharus*, 67

- festivus**, *Latirus*, 167-171
fieldi, *Pseudocerastes*, 87-88
finitimum, *Todiostrom*, 216
fiscallianus, *Unio*, 125
fitzingeri, *Clelia*, 313-315
Oxyrhopus, 312-313
Pseudoboa, 312-315
Siphophis, 312-313
flavidens, *Parreysia*, 264
flavifrons, *Vireo*, 218
flavilenta, *Holbrookia*, 341-343
flaviviridis, *Columba*, 205
forficatus, *Elanoides*, 202
Formicarius pallidus, 212
formosae, *Rhinolophus*, 41-42
formosus, *Oporornis*, 219
fraenata, *Merganetta*, 353-356
fragilis, *Lampsilis*, 261
fraseri, *Acanthodactylus*, 162
Eirenis, 79-80
fraserii, *Erator*, 213
fremminvillei, *Dryophylax*, 317-318
Philodryas, 317-318
frizzelli, *Oxyrhopus*, 313-315
fulgidus, *Coluber*, 292
Oxybelis, 292
fulica, *Heliornis*, 205
fulviventris, *Leptotila*, 206
fuscus, *Chironius*, 283
Coluber, 283

Gabillotia pseudodopsis, 140
Gaigeia, 24
gabula, *Icterus*, 220
Galbula malanogenia, 209
Gallipeurus, 386-387
gargottae, *Unio*, 127
garleppi, *Merganetta*, 351-352
gaudioni, *Unio*, 122
gaumeri, *Attila*, 212-213
Geophis diplozeugus, 286-288
dugei, 28-29
emmelii, 286
Geothlypis brachidactyla, 219
gigantea, *Amblyna*, 261
glabriorostris, *Melanoptila*, 217
glabrous, *Nimrocotes*, 385
Strongylocotes, 385
Glaucidium ridgwayi, 207
glaucinus, *Unio*, 127
Glebula suborbiculata, 261
globula, *Papuina*, 102
globulosus, *Hypopachus*, 2-4
Glossophaga, 273
Glossophaginae, 271-277
glyptocercus, *Gonodactylus*, 105-106
Gonodactylus glyptocercus, 105-106
Gonoides complanatus, 385-386
dilatatus, 376-378
gontieri, *Unio*, 131-132, 266
gracileus, *Sittasomus*, 211

graeca, *Testudo*, 89
grahamiae, *Salvadora*, 144-146
Granatellus boucardi, 220
grandis, *Anodonta*, 260
grayana, *Lanceolaria*, 263
griseus, *Tupinambis*, 60
Varanus, 60, 162
Vireo, 218
guatemalensis, *Chlorophanes*, 219
Phloeoceastes, 210
Pitangus, 214
guatiquiae, *Homalophora*, 188-189
guentheri, *Tarbophis*, 85
guerilla, *Micrastur*, 204
Guiraca caerulea, 223
guttatus, *Odontophorus*, 204
guttalata, *Eremias*, 65
Lacerta, 65
Gymnodactylus kirmanensis, 55
kotschyi, 55
scaber, 55
Gymnophthalmus birdi, 245
Gymnostinops montezuma, 220
gymnostoma, *Jacana*, 205
Gyrinus mexicanus, 16-17

Haas, Fritz, *Malacological Notes*, 93-103; A Tentative Classification of the Palearctic Unionids, 115-141; *Malacological Notes—II*, 167-174; *Records of Large Fresh-Water Mussels*, 259-270
Habia littoralis, 222
peninsularis, 222
rubicoides, 222
hainesiana, *Chamberlainia*, 264
hasselquistii, *Lacerta*, 56
Ptyodactylus, 56, 161
heathii, *Dryadophis*, 306-307
Drymobius, 306-307
Herpetodryas, 306-307
Hedymeles ludovicianus, 223
Helicops polyplepis, 280
Heliornis fulica, 205
Hemidactylus flaviviridis, 56
turcicus, 56
Hemiergis initiale, 13-14
hemisphaerula, *Planorbis*, 98
hemprichii, *Elaps*, 293
Micurus, 293
Henichorhina prosthaleuca, 217
Heptasogaster boraquirae, 378-380
boultoni, 380-382
dilatatus, 376-378
herculea, *Cristaria*, 262
Herpetodryas dendrophis, 280
heathii, 306-307
Herpetotheres chapmani, 203
herodias, *Ardea*, 201
Heterodon diadema, 74
Holbrookia approximans, 341-342
approximans, 342-343

- flavilenta*, 341-343
maculata, 342-343
propinqua, 341-342
ruthveni, 342-343
holosericeus, *Amblycerus*, 220
holotropis, *Anolis*, 9
Homalocranium marcapatae, 292-293
Homalophora guatiquiae, 188-189
 metae, 189-191
Homalosoma melanocephalum, 77-78
homochroa, *Dendrocina*, 211
homsensis, *Psilunio*, 135
horei, *Caelatura*, 262
hortulana, *Boa*, 280
hudsonius, *Circus*, 203
Hydrophis cyanocinctus, 87
Hyla baudinii, 238
 savignyi, 53
 staufferi, 239
Hylocihla mustelina, 218
 ustulata, 218
Hylonycteris, 274
Hylophilus decurtatus, 218
 ochraceiceps, 218
Hypomorphnus ridgwayi, 203
Hypopachus barberi, 1-2
 championi, 242
 globulosus, 2-4
 inguinalis, 4-5
Hypopetalia pestilens, 364
Hyridella shuttleworthii, 262
Hyriopsis cumingii, 264

iberus, *Tarbophus*, 83-84
 Trigonophis, 83-84
Icterus auratus, 221
 chrysater, 221
 galbula, 220
 igneus, 221
 mesomelas, 221
 prothemelas, 221
 spurius, 220
 virens, 219
 yucatanensis, 221
igneus, *Icterus*, 221
Imantodes cenchoa, 289
inca, *Dromicus*, 325-326
indica, *Dipsas*, 288
Indomaia substriata, 264
inguinalis, *Hypopachus*, 4-5
initiale, *Hemiergis*, 13-14
insignis, *Lepidocolaptes*, 211
insignitus, *Coluber*, 85-86
 Malpolon, 85-86
insuspecta, *Stachyris*, 111-114
integrum, *Capeloma*, 93
intermedia, *Ortalis*, 204
 Crypturellus, 199-201
interruptum, *Acanthagrion*, 372-373
iracensis, *Acanthodactylus*, 60-62
iranica, *Eirenis*, 81-82
Iridoprocne albilinea, 216

irregularis, *Phymatolepis*, 23-24
 Uta, 23-24
ischnodactylus, *Uca*, 107-108
isthmica, *Chloroceryle*, 209
itzensis, *Pachyramphus*, 213

Jacana gymnostoma, 205
jaculus, *Anguis*, 71
 Eryx, 71
janeirensis, *Planorbis*, 100
jonicus, *Unio*, 131
jouyi, *Spinus*, 224

kennedyi, *Lytorhynchus*, 75
kinetensis, *Chameleo*, 336-337
kirmanensis, *Gymnodactylus*, 55
komarowi, *Psilunio*, 135
kotschy, *Gymnodactylus*, 55
krüperi, *Unio*, 125

Lacerta aegyptia, 59
 aspera, 62
 aurata, 66
 chamaeleon, 70
 guttulata, 65
 hasselquistii, 56
 ocellata, 70
 stellio, 58
 turcica, 56
Lachesis picta, 295, 322-323
laevis, *Margaritifera*, 120
laeiventr, *Anolis*, 20-21
Lamprotula nodulosa, 264
Lampsilis carinata, 261
 fragilis, 261
 recta, 261
 teres, 261
Lanceolaria cylindrica, 263
 grayana, 263
 oxyrhyncha, 263
langsdorffi, *Micrurus*, 293-294
Lanio aurantius, 222
larcorum, *Leptodeira*, 311-312
Lasmigona complanata, 260
 costata, 260
latifolius, *Rhinolophus*, 39-40
latirostris, *Unio*, 121, 266-267
Latirus festivus, 167-171
latithorax, *Strongylocotes*, 386
lauta, *Anodonta*, 262
 Tanagra, 221
lawleyomus, *Unio*, 127
Leguminaia saulcyi, 133
 wheatleyi, 133
Leimadophis reginae, 284
lemniscatus, *Coluber*, 294
 Micrurus, 294
Lepidocolaptes insignis, 211
lepidus, *Rhinolophus*, 40-41
Leptodeira annulata, 289
 annulata, 311-312
 larcorum, 311-312

- Leptodeira rhombifera*, 246
Leptognathus peruanus, 288-289
Leptoncyteris, 276
Leptophis nigromarginatus, 283
Leptosiaphos, 332-335
Leptotila fulviventris, 206
Leptotyphlopidae, 302-305
Leptotyphlops albifrons, 28
 macrorhynchus, 71
 maximus, 27-28
 melanurus, 303-304
 phenops, 28
 rufidorsum, 302
 rufidorsus, 302
 subcrotilla, 303
 subcrotillus, 303
 tessellatus, 304-305
lessonii, *Momotus*, 209
leucogenis, *Anas*, 349-350
 Merganetta, 348-350
Leucophoyx thula, 201
lewisi, *Valvata*, 102
Lichonycteris, 274
Limnaeus sordidus, 98
Limnothlypis swainsonii, 219
lineata, *Salvadora*, 148-150
lineatissimus, *Cnemidophorus*, 25-26
lineolatum, *Coluber*, 86
 Taphrometopon, 86
lineomaculata, *Eirenis*, 80-81
Lioncyteris, 276
Liophis cobella, 285
 purpurans, 285
 taeniurus, 284
littoralis, *Habia*, 222
 Psilunio, 134, 264-265
Lonchoglossa, 276
Lonchophylla, 276
loricatus, *Centrotrachelus*, 59
 Uromastix, 59
lucida, *Segmentina*, 98
ludovicianus, *Hedymeles*, 223
lunaei, *Sceloporus*, 242
Lygophis elegans, 317-318
 poecilostomus, 315-317
 taeniurus, 284
Lygosoma meleagris, 332
 weberi, 335-336
Lytorhynchus diadema, 74
 kennedyi, 75

Mabuia brevicollis, 67
 tessellata, 67
Mabuya aurata, 66
 brevicollis, 67
 septemtaeniata, 66
 tessellata, 67
 varia, 332
 vittata, 67
macao, *Ara*, 206
macroglossa, *Rana*, 239-241

macrorhynchus, *Leptotyphlops*, 71
 Stenostoma, 71
macrostemma, *Eutaenia*, 29-30
 Thamnophis, 29-30
maculata, *Holbrookia*, 342-343
magnolia, *Dendroica*, 219
major, *Rosthamus*, 202
malanogenia, *Galbula*, 209
Malpolon insignitus, 85-86
 moilensis, 86
Manacus candei, 213
mancus, *Unio*, 126
mandeli, *Diglossa*, 155-157
marcapatae, *Homalocranium*, 292-293
 Tantilla, 292-293
Margaritifera, 119-120
 auricularia, 119, 264
 dahurica, 120, 264
 laevis, 120
 margaritifera, 120
 maroccana, 119
 middendorffi, 120
margaritifera, *Margaritifera*, 120
Margaritiferae, 119-120
marinus, *Bufo*, 238
marmorata, *Norops*, 10
maroccana, *Margaritifera*, 119
martini, *Tarbophis*, 84-85
martinica, *Porphyrula*, 205
mascareniensis, *Rana*, 332
massena, *Trogon*, 209
Masticophis melanolomus, 29
matudae, *Agelaius*, 221
maximus, *Leptotyphlops*, 27-28
maya, *Xanthoura*, 217
mcewani, *Tarbophis*, 82-83
Megaceryle torquata, 209
megalops, *Eutaenia*, 30-31
 Thamnophis, 30-31
Megarhynchus mexicanus, 214
melanocephala, *Coluber*, 293
 Tantilla, 293
 Tantilla, 318-319
 Trogon, 208-209
melanocephalum, *Homalosoma*, 77-78
melanocephalus, *Rhynchocalamus*, 77-78
melanolomus, *Eudryas*, 29
 Masticophis, 29
Melanoptila glabrirostris, 217
melanurus, *Drymarchon*, 307-308
 Leptotyphlops, 304-305
 Spilotes, 307-308
meleagris, *Lygosoma*, 332
mentalis, *Pipra*, 213
Merganetta armata, 353-356
 berlepschi, 352-353
 colombiana, 346-348
 fraenata, 353-356
 garleppi, 351-356
 leucogenis, 348-350
 turneri, 350-351

- meridionalis*, *Anolis*, 9
Norops, 9
mertensi, *Micrurus*, 319-320
Mesalina brevirostris, 66
meserythrus, *Crypturellus*, 199
mesomelas, *Icterus*, 221
metae, *Homalophora*, 189-191
mexicanum, *Siredon*, 16-17
mexicanus, *Cassidix*, 220
Gyrinus, 16-17
Megarhynchus, 211
Nyctibius, 207
Onychorhynchus, 215
Xenops, 211
Micrastur guerilla, 204
naso, 204
Microcondylaea, 133
compressa, 133
microlepis, *Agama*, 57
Spalerosophis, 76
Stellio, 57
Uromastix, 59
microphthalma, *Syntermophora*, 184
microphthalmus, *Bothrops*, 295
Trimeresurus, 295
microtis, *Bufo*, 238
Micrurus averyi, 45-47
balzani, 293
hemprichii, 293
langsдорffi, 293-294
lemniscatus, 294
mertensi, 319-320
obscura, 294
olssoni, 321-322
surinamensis, 295
tschudii, 320
tschudii, 321-322
micrus, *Buteo*, 203
middendorffi, *Margaritifera*, 120
Pseudanodonta, 140, 265
Unio, 122
Mimus clarus, 218
minimus, *Empidonax*, 215
minor, *Rhinolophus*, 38-39
minutilla, *Erolia*, 205
Miozetetes superciliosus, 214
mizolepis, *Ophisops*, 64-65
Mniotilta varia, 219
moesta, *Tantilla*, 32-34
moilensis, *Coluber*, 86
Malpolon, 86
molestus, *Neogomphus*, 366-367
Momotus exiguus, 209
lessonii, 209
mongolicus, *Unio*, 132
Monophyllus, 277
montana, *Oreopelia*, 206
montezuma, *Gymnostinops*, 220
moreletii, *Sporophila*, 224
mosquinianus, *Unio*, 126
moussonianus, *Unio*, 122
mucidus, *Unio*, 123
multiventris, *Chironius*, 282-283
mustelina, *Hylocichla*, 218
Mycertia americana, 202
Myiarchus crinitus, 214
nelsoni, 214
platyrhynchus, 215
yucatanensis, 215
Myiobius sulphureipygus, 215
Myiochanes brachytarsus, 215
najadum, *Coluber*, 73
Tyria, 73
nana, *Amazona*, 206
Nannorchilus brachyurus, 217
naso, *Micrastur*, 204
nasus, *Conopsis*, 32
Natrix blanchardi, 29
tessellata, 71-72
nebuloides, *Anolis*, 21
Needham, James G., and Bullock, Dillman S., *The Odonata of Chile*, 357-373
nelsoni, *Myiarchus*, 214
Nemec, Claire, *Carcinological Notes*, 105-108
Neogomphus, 366-367
bidens, 367
molestus, 366-367
Neureergus crocatus, 52-53
nigricaudus, *Atractus*, 327-329
nigriceps, *Piculus*, 230-232
Tarbophis, 84
nigrogularis, *Colinus*, 204
nigromarginatus, *Ahaetulla*, 283
Leptophis, 283
Nirmocotes, 384-386
cordiceps, 386
glabrous, 385
nirmoides, 385-386
orbicularis, 385
nirmoides, *Nirmocotes*, 385-386
Nirmus ansatus, 382-384
tiniami, 382-384
nodulosa, *Lamprotula*, 264
Norops auratus, 9
marmorata, 10
meridionalis, 9
ophiolepis, 10
sladeniae, 9
Northarchus dysoni, 209
nummifer, *Coluber*, 75
nummifera, *Elaphe*, 75-76
nupta, *Agama*, 57
Nyctanassa violacea, 201
Nyctibius mexicanus, 251
Nyctidromus yucatanensis, 207
oberon, *Sceloporus*, 253-257
obscura, *Elaps*, 294
Obstructio, 100

- ocellata, *Agriocharis*, 204-205
Lacerta, 70
 ocellatus, *Chalcides*, 70
 ochraceiceps, *Hylophilus*, 218
 octolineatus, *Cnemidophorus*, 27
Odontophorus guttatus, 204
olfersii, *Coluber*, 291
Philodryas, 291
oligoporus, ***Cnemidophorus***, 26-27
 olloporus, *Sceloporus*, 242
 olssoni, *Micrurus*, 321-322
Omostoma cinereigulare, 216
Onychorhynchus mexicanus, 215
ophiolepis, *Anolis*, 10
Norops, 10
Opisops blanfordi, 64-65
ehrenbergii, 64
elegans, 63-64
mizolepis, 64-65
schlueteri, 64
Oporornis formosus, 219
orbicularis, *Nimrocotes*, 385
Strongylocotes, 385
Oreopelia montana, 206
orientalis, *Acanthodactylus*, 62
ornata, *Cistudo*, 18-19
Terrapene, 18-19
Ortalis intermedia, 204
pallidiventris, 204
ortonii, *Boa*, 305-306
osgoodi, ***Aulacorhynchus***, 228-230
Rhinolophus, 40-41
Otus thompsoni, 207
Oxyagris rufulum, 371-372
Oxybelis acuminatus, 291-292, 318
argenteus, 292
fulgidus, 292
Oxyaia pugio, 263
Oxyrhopus bitorquatus, 290
fitzingeri, 312-313
frizzelli, 313-315
petolus, 290
trigeminus, 290
oxyrhynga, *Lanceolaria*, 263

Pachyrhamphus itzensis, 213
pacifica, *Rhinocoryne*, 96
palaestinae, *Vipera*, 87
pallens, *Unio*, 124
pallescens, *Columbigallina*, 205
pallida, *Agama*, 57, 161
Eucometis, 222
pallidicrissa, *Columba*, 205
pallidiventris, *Ortalis*, 204
pallidus, *Formicarius*, 212
palpebralis, *Chamaethlypis*, 219
palustris, *Stagnicola*, 99
Pampa pampa, 208
pampa, *Pampa*, 208
papa, *Sarcoramphus*, 202
Papuina globula, 102
parellina, *Cyanocompsa*, 223

Parreysia favidens, 264
parvus, *Dryobates*, 211
Passerculus rufofuscus, 159-160
Passerina ciris, 224
cyanea, 224
pauciscutatus, ***Atractus***, 326-327
pectinata, *Ctenosaura*, 23
Cyclura, 23
penchinatianus, *Unio*, 126
Penelope purpurascens, 204
peninsularis, *Habia*, 222
pensylvanica, *Dendroica*, 219
percautus, *Tinamous*, 199
Periops schiraziana, 77
persica, *Agama*, 57, 162
Eremias, 66
persicus, *Cerastes*, 88
Pseudocerastes, 88
personata, *Tityra*, 213
peruviana, *Tachymenis*, 290-291, 315
Trachymenis, 290-291
peruvianus, *Dipsas*, 288-289
Leptognathus, 288-289
pestilens, *Hypopetalia*, 364
petersi, *Aspatharia*, 262
petola, *Coluber*, 290
petolus, *Oxyrhopus*, 290
Phenes raptor, 361-364
phenops, *Leptotyphlops*, 28
Stenostoma, 28
philbyi, ***Scincus***, 162-165
Philodryas elegans, 317-318
elegans, 315-317
freminvillei, 317-318
olfersii, 291
rufidorsatus, 315-317
simonsii, 316-317
viridissimus, 291
Phloeocaeates guatemalensis, 210
Phoenicopterus ruber, 202
Phoethornis adolphi, 207-208
Phrynocephalus arabicus, 58
scutellatus, 59
Phrynosoma cortezi, 23
Phyllodactylus elisae, 56
Phymatolepis irregularis, 23-24
Piaya thermophila, 207
picea, *Agama*, 58
picta, *Lachesis*, 295, 322-323
pictorum, *Unio*, 120-121, 266
pictus, *Bothrops*, 322-323
Trimeresurus, 295, 323-324
Piculus nigriceps, 230-232
yucatanensis, 210
Pionus decoloratus, 206
piapiens, *Rana*, 241-242
Pipra mentalis, 213
Pipromorpha assimilis, 216
Piranga roseo-gularis, 222
rubra, 222
Pitangus guatemalensis, 214
Placostylus dorseyi, 102

- Planorbis calathus*, 98
 hemisphaerula, 98
 janeirensis, 100
 swinhoi, 98
Planorbulina, 100
Platalina, 273
Platypeltis emoryi, 19
Platypsaris sumichrasti, 213
 yucatanensis, 213
platyrhynchoideus, Unio, 123, 267
platyrhynchus, *Myiarchus*, 215
 Unio, 122, 267
Platyrinchus cancrinus, 215
Pleurovalvata, 101-103
plicata, *Amblena*, 260-261
poecilostomus, *Lygophis*, 315-317
poliogaster, *Caryothraustes*, 223
Poliophtila deppei, 218
polylepis, *Helicops*, 280
Polypylis, 97
Pope, Clifford H., Copulatory Adjustment in Snakes, 249-252
Porphyryula martinica, 205
praeposterus, Unio, 121
pratricula, Tyto, 207
pretiosa, *Claravis*, 205-206
prevostii, *Anthracotheorax*, 208
princeps, *Eumeces*, 67-68
 Euprepis, 67-68
Pristurus rupestris, 56
proechistus, Unio, 122
proechus, Unio, 122
propinqua, *Holbrookia*, 341-342
Proptera capax, 261
prostheleuca, *Henichorhina*, 217
prothemelas, *Icterus*, 221
Protonotaria citrea, 219
Protosquilla cerebralis, 105-106
Psamphis schokari, 86-87
Pseudanodonta, 138-140
 compacta, 140, 265
 complanata, 139
 elongata, 139
 middendorffi, 140, 265
Pseudoboa carinata, 88
 fitzingeri, 312-315
Pseudocerastes fieldi, 87-88
 persicus, 88
Pseudodontopsis, 133
 euphraticus, 133, 265
pseudodontopsis, *Gabillotia*, 140
Psilorhinus cyanogenys, 216
Psilunio, 134-136
 acarnanicus, 134
 delesserti, 135
 fellmanni, 135-136
 homsensis, 135
 komarowi, 135
 littoralis, 134, 264-265
 semirugatus, 135
 umbonatus, 134, 265
Pteroglossus erythrozonus, 210
Ptyodactylus hasselquistii, 56, 161
puella, *Trogon*, 208
pugio, *Oxyaia*, 263
Puliciphora termitophila, 191-192
punctatus, *Acontias*, 337
 Typhlops, 337
purpurans, *Ablabes*, 285
 Liophis, 285
purpurascens, *Penelope*, 204
Pusia torticula, 171-172
pusilla, *Compsothlypis*, 219
Pyrocephalus blattus, 214

Quadrulinae, 134-136
quellenei, Unio, 125

Ramphastos sulfuratus, 210
Ramphocaenus rufiventris, 218
Rana macroglossa, 239-241
 mascareniensis, 332
 pipiens, 241-242
 ridibunda, 53-54
raptor, *Phenes*, 361-364
 Saltator, 222-223
ravergieri, *Coluber*, 76
 Elaphe, 76
ravoisieri, Unio, 123
recta, *Lampsilis*, 261
reginae, *Coluber*, 284
 Leimadophis, 284
regularis, *Bufo*, 332
requienii, Unio, 126
Rhinocoryne pacifica, 96
Rhinolophus, 39-40
 angustifolius, 43
 annectens, 37-38
 chaseni, 38-39
 diversus, 42-43
 formosae, 41-42
 latifolius, 39-40
 lepidus, 40-41
 minor, 38-39
 osgoodi, 40-41
 septentrionalis, 40
 tener, 40
rhinopoma, *Dipsas*, 85
 Tarbophis, 85
rhodorachis, *Coluber*, 73, 165
 Zamenis, 73
rhombifera, *Leptodeira*, 246
Rhynchocalamus arabicus, 77
 melanocephalus, 77-78
Rhynchocyclus brevirostris, 215
Richmondia yucatanica, 223
ridgwayi, *Glaucidium*, 207
 Hypomorphnus, 203
 Stelgidopteryx, 216
ridibunda, *Rana*, 53-54
rivularis, *Cissolopha*, 217
robustus, *Acanthodactylus*, 63
rodolpheii, *Stachyris*, 110

- rogersi, Coluber, 73-74
Zamenis, 73-74
rosenbergi, *Anolis*, 9
roseo-gularis, Piranga, 222
rostratus, Unio, 122
Rostrhamus major, 202
rothi, *Eirenis*, 80
rousii, Unio, 126
ruber, *Phoenicopterus*, 202
rubescens, *Anthus*, 218
rubicoides, *Habia*, 222
rubiginosa, *Dendroica*, 219
rubra, Piranga, 222
rubriventris, *Centurus*, 210
runderata, *Agama*, 57
rufidorsatus, *Dromicus*, 315-317
Philodryas, 315-317
rufidorsum, *Leptotyphlops*, 302
rufidorsus, *Leptotyphlops*, 302
rufigularis, *Dromococcyx*, 207
rufipennis, *Columbigallina*, 205
rufiventris, *Ramphocaenus*, 218
rufofuscus, *Passerculus*, 159-160
rufulum, *Oxyagron*, 371-372
rugulosus, *Eleutherodactylus*, 239
rupestris, *Pristurus*, 56
ruthveni, *Holbrookia*, 342-343
ruticilla, *Setophaga*, 220
rutila, *Amazilis*, 208
- sackii*, *Cnemidophorus*, 244-245
sallaei, Trogon, 209
Saltator atriceps, 222
raptor, 222-223
yucatanensis, 223
Salvadora deserticola, 146-148
grahamiae, 144-146
lineata, 148-150
 Sanborn, Colin C., Eight New Bats of the Genus *Rhinolophus*, 37-43; External Characters of the Bats of the Subfamily Glossophaginae, 271-277
sancti-thomae, *Dendrocolaptes*, 211
sandrii, Unio, 125
sanguinolentus, *Veniliornis*, 210
Sarcoramphus papa, 202
sauleyi, *Leguminaia*, 133
savignyi, *Hyla*, 53
scaber, *Gymnodactylus*, 55
Stenodactylus, 55
Sceloporus lunaei, 242
oberon, 253-257
oloporus, 242
Schiffornis verae-pacis, 213
schiraziana, *Periops*, 77
schirazianus, *Spalerosophis*, 77
Schistodesmus lampreyanus, 263
schlueteri, *Ophisops*, 64
 Schmidt, Karl P., Amphibians and Reptiles from the Sudan, 331-338; New Central American Frogs of the Genus *Hypopachus*, 1-5; A New Coral Snake from British Guiana, 45-47; A New Lizard from Mexico, with a Note on the Genus *Norops*, 7-10; A New Toad from Western China, 151-154; Notes on Texan Snakes of the Genus *Salvadora*, 143-150; Reptiles and Amphibians from Central Arabia, 161-165; Reptiles and Amphibians from Southwestern Asia, 49-92
 Schmidt, Karl P., and Stuart, L. C., The Herpetological Fauna of the Salama Basin, Baja Verapaz, Guatemala, 233-247
 Schmidt, Karl P., and Walker, Warren F., Peruvian Snakes from the University of Arequipa, 279-296; Snakes of the Peruvian Coastal Region, 297-324; Three New Snakes from the Peruvian Andes, 325-329
schmidtii, *Anolis*, 21-23
schokari, *Coluber*, 86-87
Psamophis, 86-87
schrenkianus, Unio, 122, 267
Scincus arabicus, 69-70
conirostris, 70
philbyi, 162-165
sepsoides, 70
vittatus, 67
Scleronycteris, 274
scutellata, *Agame*, 59
scutellatus, *Phrynocephalus*, 59
 Seever, Charles H., New Termitophilous Diptera from the Neotropics, 175-193
 Segmentina, 97
lucida, 98
Seiurus aurocapillus, 219
semiferrugineum, *Cerithium*, 171
semirugatus, *Psilunio*, 135
sepsoides, *Chalcides*, 70
septemtaeniata, *Mabuya*, 66
septemtaeniatus, *Euprepis*, 66
septentrionalis, *Rhinolophus*, 40
Setophaga ruticilla, 220
severus, *Coluber*, 284-285
Xenodon, 284-285
shuttleworthii, *Hyridella*, 262
Sibon annulatum, 311-312
similis, *Ceophloeus*, 210
simonsii, *Philodryas*, 316-317
sinaita, *Agama*, 58
sincera, *Valvata*, 101
Sinotaia, 96
Siphophis fitzingeri, 312-313
Siredon dumerilii, 17
mexicanum, 16-17
Sittasomus gracileus, 211
sladeniae, *Norops*, 9

- Smith, Hobart M., A New Australian Lizard, with Note on *Hemierris*, 11-14; Notes on Mexican Reptiles and Amphibians, 15-35; The White Sands Earless Lizard, 339-344
- Smith, Hobart M., and Brown, Bryce C., A New Subspecies of *Sceloporus jarrovi* from Mexico, 253-257
- sordidus*, *Limnaeus*, 93
- Spalerosophis cliffordii*, 77, 165
- microlepis*, 76
- schirrazianus*, 77
- sparverius*, Falco, 204
- spatiosa*, Cristaria, 263
- Spilotes dichrous*, 307-308
- melanurus*, 307-308
- Spinus jouyi*, 224
- Spizaetus tyrannus*, 203
- vicarius*, 203
- splendens*, Volatinia, 224
- Sporophila moreletii*, 224
- spurius*, Icterus, 220
- Stachyris adjuncta*, 110-111
- insuspecta*, 111-114
- rodolpheii*, 110.
- Stagnicola palustris*, 99
- staufferi*, Hyla, 239
- Stelgidopteryx ridgwayi*, 216
- Stellio caucasicus*, 57
- microlepis*, 57
- stellio*, Agama, 58, 162
- Lacerta*, 58
- Stenodactylus scaber*, 55
- sthenodactylus*, 54
- Stenorhina degenhardtii*, 245-246
- Stenostoma macrorhynchus*, 71
- phenops*, 28
- Sthenodactylus, Ascalabotes*, 54
- sthenodactylus*, *Stenodactylus*, 54
- stictoptera*, Chloroceryle, 209
- Strongylocotes*, 384-386
- complanatus*, 385-386
- cordiceps*, 386
- glabrous*, 385
- latithorax*, 386
- orbicularis*, 385
- tinnami*, 382-384
- wernecki*, 386
- subcrotilla*, *Leptotyphlops*, 303
- subcrotillus*, *Leptotyphlops*, 303
- suborbiculata*, *Glebula*, 261
- subpagana*, *Elainea*, 216
- substriata*, *Indonaia*, 264
- sulcirostris*, *Crotophaga*, 207
- sulfuratus*, *Ramphastos*, 210
- sulphureipygus*, *Myiobius*, 215
- sumichrasti*, *Conophis*, 31-32
- Platyparis*, 213
- superciliosa*, *Eumomota*, 209
- supercilius*, *Miozetetes*, 214
- surinamensis*, *Elaps*, 295
- Micrurus*, 295
- swainsonii*, *Limnotherylis*, 219
- swinhoei*, *Planorbis*, 98
- Synallaxis erythrothorax*, 211
- Syntermophora*, 183-184
- microphthalmia*, 184
- syriacus*, *Acanthodactylus*, 63
- Tarbophis*, 83
- Tachymenis bitorquatus*, 290
- canilatus*, 315-317
- elegans*, 315-317
- peruviana*, 290-291, 315
- tachymenoides*, *Dromicus*, 309-310
- taeniurus*, *Liophis*, 284
- Lygophis*, 284
- tamaulipensis*, *Turdus*, 218
- Tanagra affinis*, 221
- lauta*, 221
- Tangavius aeneus*, 220
- Tantilla capistrata*, 318-319
- cuniculator*, 32-34
- marcapatae*, 292-293
- melanocephala*, 293
- melanocephala*, 318-319
- moesta*, 32-34
- Tapaya cortezii*, 23
- Taphrometopon lineolatum*, 86
- Tarbophis guentheri*, 85
- martini*, 84-85
- mcewani*, 82-83
- nigriceps*, 84
- rhinopoma*, 85
- syriaca*, 83
- syriacus*, 83
- Tarbophus iberus*, 83-84
- tener*, *Rhinolophus*, 40
- teres*, *Lampsilis*, 261
- terminalis*, *Unio*, 124
- termitophila*, *Puliciphora*, 191-192
- termitoxena*, *Ecitomyia*, 186-188
- Terrapene ornata*, 18-19
- yucatanana*, 17-18
- terrifica*, *Caudisoma*, 296
- terrificus*, *Crotalus*, 296
- tessellata*, *Coronella*, 71-72
- Mabuia*, 67
- Mabuya*, 67
- Natrix*, 71-72
- tessellatum*, *Typhlops*, 303-304
- tessellatus*, *Leptotyphlops*, 304-305
- Testudo caspica*, 89
- euphratica*, 89
- graeca*, 89
- zarudnyi*, 89
- Thamnophilus yucatanensis*, 211-212
- Thamnophis macrostemma*, 29-30
- meagalops*, 30-31
- thermophila*, *Piaya*, 207
- thompsoni*, *Otus*, 207

- Thraupis abbas*, 221
Thryothorus albinucha, 217
 canobrunneus, 217
thula, *Leucophoyx*, 201
tigridis, *Unio*, 123-124
Tinamus percautus, 199
tiniami, *Nirmus*, 382-384
 Strongylocotes, 382-384
Tityra deses, 213
 personata, 213
Todirostrum finitimum, 216
Tolmomyias cinereiceps, 215
Torotaia, 96
torquata, *Megaceryle*, 209
tortricula, *Pusia*, 171-172
Trachymenis peruviana, 290-291
Traylor, Melvin A., Jr., Birds from the
 Yucatan Peninsula, 195-225
trigeminus, *Oxyrhopus*, 290
Trigonophis iberus, 83-84
Trimeresurus atrox, 295
 barnetti, 322
 microphthalmus, 295
 pictus, 295, 322-323
Trionyx euphraticus, 88
Tritogonia verrucosa, 260
Trogon massena, 209
 melanocephala, 208-209
 puella, 208
 sallaei, 209
tschudii, *Elaps*, 320
 Micrurus, 320
 Micrurus, 321-322
tuberculatus, *Alsophylax*, 54-55
 Bunopus, 54-55
tumidus, *Unio*, 128, 267
Tupinambis griseus, 60
turcicus, *Hemidactylus*, 56
 Lacerta, 56
Turdus tamaulipensis, 218
turneri, *Merganetta*, 350-351
turtoni, *Unio*, 125
typhla, *Dendrocincla*, 211
Typhlops punctatus, 337
 tesellatum, 303-304
 vermicularis, 71
Tyrannus chloronotus, 214
 Spizaetus, 203
Tyria najadum, 73
Tyto pratincola, 207
tzacatl, *Amazilis*, 208

Uca ischnodactylus, 107-108
umbonatus, *Psilunio*, 134, 265
uncinatus, *Chondroheirax*, 202
undulata, *Ameiva*, 242-243
Unio, 120-132
 abyssinicus, 124
 aleroni, 126
 ascanius, 122
 batavus, 130-131
 borysthensis, 129, 267
 bourgeticus, 125
 bruguierianus, 132
 carneus, 131
 crassus, 129, 266
 cytherea, 129, 266
 decipiens, 125
 delphinus, 123
 dembeae, 128
 durieui, 128
 elongatulus, 124
 eucirrus, 128
 fiscallianus, 125
 gargottae, 127
 gaudioni, 122
 glaucinus, 127
 gontieri, 131-132, 266
 jonicus, 131
 krüperi, 125
 latirostris, 121, 266-267
 lawleyanus, 127
 mancus, 126
 middendorffi, 122
 mongolicus, 132
 mosquinianus, 126
 moussonianus, 122
 mucidus, 123
 pallens, 124
 penchinatianus, 126
 pictorum, 120-121, 266
 platyrhynchoideus, 123, 267
 platyrhynchus, 122, 267
 praeposterus, 121
 proëchistus, 122
 proëchus, 122
 quelleneci, 125
 ravoisieri, 123
 requienii, 126
 rostratus, 122
 rousii, 126
 sandrii, 125
 schrenckianus, 122, 267
 terminalis, 124
 tigridis, 123-124
 tumidus, 128, 267
 turtoni, 125
 valentinus, 127
Unionidae, 120-132
Unioninae, 120-132
 urmiana, *Apathya*, 60
Uromastix aegyptius, 59, 162
 loricatus, 59
 microlepis, 59
ustulata, *Hylocichla*, 218
Uta irregularis, 23-24

valentinus, *Unio*, 127
Valvata densestriata, 102
 lewisi, 102
 sincera, 101
Varanus griseus, 60, 162
varia, *Mabuya*, 332
 Mniotilta, 219

- variegatus**, *Eumeces*, 68-69
varius, *Euprepes*, 332
velox, *Accipiter*, 202
Veniliornis sanguinolentus, 210
ventromaculatus, *Coluber*, 74
verae-pacis, *Schiffornis*, 213
vermicularis, *Typhlops*, 71
verrucosa, *Tritogonia*, 260
vertebralis, *Atractus*, 286
verticalis, *Arremonops*, 224
vescoiana, *Anodonta*, 138, 265
vicarius, *Spizaetus*, 203
viduus, *Conophis*, 31
villosa, *Cordulia*, 367-370
violacea, *Nyctanassa*, 201
Vipera euphratica, 87
 palaestinae, 87
virens, *Icteria*, 219
Vireo flavifrons, 218
 griseus, 218
virescens, *Butorides*, 201
viridis, *Bufo*, 53, 161
viridissimus, *Coluber*, 291
 Philodryas, 291
vitellinus, *Dryophylax*, 315-317
vittata, *Mabuya*, 67
vittatus, *Basiliscus*, 242
 Conophis, 31-32
 Scincus, 67
vociferus, *Charadrius*, 205
Volatinia splendens, 224

watsonana, *Eremias*, 66
weberi, *Lygosoma*, 335-336

wernecki, *Strongylocotes*, 386
wheatleyi, *Leguminaia*, 133
Wilsonia citrina, 220
woodiana, *Anodonta*, 138
wrighti, *Bufo*, 151-154

xantholora, *Amazona*, 206
Xanthoura maya, 217
Xenodon severus, 284-285
Xenops mexicanus, 211
Xiphorhynchus yucatanensis, 211

yucatanica, *Cistudo*, 17-18
 Terrapene, 17-18
yucatanensis, *Amazilis*, 208
 Cyclarhis, 218
 Icterus, 221
 Myiarchus, 215
 Nyctidromus, 207
 Piculus, 210
 Platypsaris, 213
 Saltator, 223
 Thamnophilus, 211-212
 Xiphorhynchus, 211
yucatanica, *Cissolopha*, 217
 Richmondiana, 223

Zamenis asiana, 72-73
 caudaelineatus, 76
 rhodorachis, 73
 rogersi, 73-74
zarudnyi, *Diplometopon*, 60
 Testudo, 89
Zenaida asiatica, 215



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